

least one of the grooves including a plurality of recesses extending entirely within the insulating layer, from the bottom surface of the groove, and into the insulating layer; and a conductive layer filling each of the grooves and the recesses, the conductive layer including at least a plated layer covering the side surfaces and the bottom surfaces of the grooves and internal surfaces of the recesses.

2. (Twice Amended) The semiconductor device according to claim 1, wherein the groove including the recesses has a ratio of depth to width of not more than 0.7.

3. (Twice Amended) The semiconductor device according to claim 1, wherein the groove including the recesses has a ratio of depth to width of not more than 0.35.

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4. (Twice Amended) The semiconductor device according to claim 1, wherein the recesses have a groove shape, with a ratio of depth to width greater than 0.35.

5. (Twice Amended) The semiconductor device according to claim 1, wherein the recesses have a groove shape, with a ratio of depth to width greater than 0.7.

6. (Twice Amended) The semiconductor device according to claim 1, wherein the recesses have a hole shape, with a ratio of depth to width greater than 0.35.

7. (Twice Amended) The semiconductor device according to claim 1, wherein the recesses have a hole shape, with a ratio of depth to width greater than 0.7.

8. (Twice Amended) The semiconductor device according to claim 1, wherein the recesses have two slanting side faces intersecting each other in a cross-sectional view.

9. (Twice Amended) The semiconductor device according to claim 8, wherein the side faces are slanted with an angle greater than 20 degrees relative to the surface of the insulating layer.

10. (Twice Amended) The semiconductor device according to claim 1, wherein the recesses have a pitch not more than 4 times a width of the recesses.

In re Appln. of YOSHIHIKO TOYODA
Application No. 09/892,603

Add the following claim:

13. (New) The semiconductor device according to claim 1, wherein the side surfaces and the bottom surfaces of the grooves are transverse to and parallel to the outside surface of the insulating layer, respectively.